CURITIBA URBAN TRANSPORT SYSTEM

(BR-0209)

EXECUTIVE SUMMARY

BORROWER:	Municipality of Curitiba (PMC)	
GUARANTOR:	Federative Republic of Brazil	
EXECUTING AGENCY:	Municipality of Curitiba	
AMOUNT AND SOURCE:	IDB:	US$120.0 million (OC)
	Local counterpart funding:	
	– PMC	US$ 65.6 million
	– Private sector	US$ 46.0 million
	Total:	US$231.6 million
FINANCIAL TERMS AND CONDITIONS:	Amortization period:	20 years
	Disbursement period:	3 years
	Interest rate:	variable
	Inspection and supervision:	1%
	Credit fee:	0.75%

OBJECTIVES:

The program is designed to improve the quality of life in the city of Curitiba. Specifically, it will improve public transport service particularly for users in low-income areas on the outskirts of the city without increasing real operating costs determined when the fare was set. Accordingly, no fare increases will be attributable to the program.

A number of activities are planned to achieve these objectives. They will: (i) alleviate overcrowding on buses along the North-South corridor, the busiest in the city; (ii) speed up the boarding and off-loading of passengers and shorten total travel time by bus; (iii) afford greater convenience and safety to users in low-income areas through paving and street lighting along bus routes, and the construction of sidewalks and bicycle paths; (iv) reduce traffic accidents, particularly involving pedestrians; and (v) eliminate the need for long journeys in order to reach public services and commercial areas, with centers offering these services in the vicinity of bus terminals.

DESCRIPTION:

The program will be divided into five individual components, having the subcomponents described below.

The Bank will help to finance some of the civil works and to implement road safety measures, monitor the public transport system, and strengthen institutional capacity. The PMC will provide the local counterpart funding for the loan. Bus service will be operated under concessions granted to companies in the private sector, that will procure and operate the vehicles described below:

1. Boosting capacity along the North-South corridor

This components consists of: (i) paving road surfaces on bus routes along the North-South corridor; (ii) construction of new tube stations to speed up the boarding and off-loading of passengers; and (iii) procurement of 66 semi-articulated buses and an additional 65 units to enhance rapid boarding and off-loading by semi-articulated buses and/or other improvements.

2. Improvement of feeder roads

This component consists of: (i) paving, drainage works, street lighting, and sidewalk construction on approximately 100 km of bus routes in low-income areas on the outskirts of the city; and (ii) improvements at some intersections and construction of foot bridges to speed up the flow of traffic.

3. Facilities for public transport users

This component will include: (i) the construction of six user support centers (CAURs) adjacent to the largest integrated transport terminals. These centers will house government offices, banks, and shops in an effort to reduce the need for travel downtown; (ii) integrated terminals will be built and existing ones renovated to accommodate the new semi-articulated buses; and (iii) access to bus terminals will be improved with the addition of pedestrian walkways and bicycle paths.

4. Traffic markings and road safety

This components entails the following activities: (i) a road safety program and the placement of basic traffic signs and signals to enhance traffic safety; (ii) installation of new traffic lights, signs, and automatic control systems; and (iii) procurement of vehicles to monitor road safety.

5. Planning and monitoring of public transport

To boost the institutional capacity of the body responsible for traffic safety and the data base used for urban public transport planning and control, the following activities will be carried out: (i) procurement of equipment and software for the geographical information system in areas served by the program, and training in its use; and (ii) procurement of equipment and systems to monitor the movement of the bus fleet.

ENVIRONMENTAL CLASSIFICATION: The Environment Committee, at its meeting of November 16, 1994, classified this as a Category III operation. The environmental impact assessments have been concluded and the summary has been available to the public since February 23, 1995. A building permit has been granted for the program by the Paraná Environmental Authority. The environmental summary was approved by the CMA at its meeting on May 16, 1995.

BENEFITS: The program will provide better public transport and additional facilities for the people of Curitiba, particularly users in low-income groups. The community will also benefit from: (a) shorter travel time and shorter routes; (b) fewer traffic accidents; (c) a reduction in the number of buses on the road with the use of larger, high-capacity vehicles on the North-South corridor; (d) a reduction in fuel consumption and air pollution; (e) lower vehicle operating costs; and (f) a reduction in the cost of road maintenance. Other benefits will accrue too although they cannot be quantified in monetary terms. They will be reflected in the improved quality of urban life and will be especially evident to users of public transport and residents of low-income neighborhoods. As a result: (i) urban properties around the integrated bus terminals will rise in value with the presence of the CAURs; (ii) the principal bus corridor will be made fully accessible to the handicapped; (iii) properties in low-income neighborhoods will rise in value and the areas will be made safer as a result of road paving and street lighting; and (iv) the network of bicycle paths will be expanded in areas where bicycles are used for commuting to work.

RISKS: Certain risks are normally associated with urban transport programs. These include the possibility of insufficient local counterpart funding and the inability of the executing agency to prepare and implement the different components according to plan. Another problem is local resistance to radical changes in transportation routes and traffic patterns. Finally, certain types of tenders engender problems and

it is difficult to ensure that contracts are faithfully performed.

The risks associated with the present program are minor. Most of the local counterpart funding has been guaranteed with financing for buses which have already been purchased by the concessionaires and with initial investments made by the PMC. Technically, the program is of the highest calibre and is now virtually ready. The PMC has been carrying out similar works successfully for some time, and the target population is familiar with and supports the type of work involved. A lower inflation rate and the efficiency with which the PMC has been holding calls for tenders lessens the likelihood of problems arising during the bidding process to hamper completion of the program.

Any shortcomings in coordinating activities in different branches and decentralized offices of the PMC taking part will be offset by the presence of a Technical Management Support Unit (UTAG), which will report directly to the Mayor of Curitiba.

THE BANK'S COUNTRY AND SECTOR STRATEGY:

The program meets the Bank's selection criteria in the following areas: (i) it addresses social needs by providing better public transport for low-income districts in the PMC; (ii) it will make for a cleaner urban environment through measures to encourage the use of public transport and non-motorized transport; (iii) the private sector will participate in the operation of the municipal bus system; and (iv) institutional strengthening of the public sector through support for an efficient urban and transport planning system that may also serve as a pilot project for other cities.

EXCEPTIONS TO THE BANK'S POLICY:

Pursuant to a request by the Government of Brazil, the guarantee contract will not include a guarantee by the federal government to provide local counterpart funding for the program. The government will not be required to make good on obligations undertaken by the borrower for which the federal government is not legally liable.

This was decided in light of Brazil's constitutional and legal regulations governing administrative decentralization and a government policy concerned with bringing public expenditure under control. The financial analysis shows that the borrower has the financial capacity to furnish the necessary counterpart funding for the program.

SPECIAL CONTRACTUAL CONDITIONS:

Prior to the first disbursement of the financing, the borrower will be required to demonstrate that: (i) the UTAG has been set up with the necessary complement of staff (paragraphs 3.2, 3.3, and 3.17, which has now been met); and (ii) agreements have been signed with Urbanização de Curitiba, S.A. (URBS) and Instituto de Pesquisas e Planejamento Urbano de Curitiba (IPPUC), both of which are decentralized municipal agencies and the borrower has agreed to transfer funds to cover the obligations of these agencies under the program and the maintenance of the works (paragraph 3.20).

Under this program, all contracts with a value of at least US$350,000 in the case of goods and of at least US$5 million in the case of works will be awarded by international competitive bidding (paragraph 3.20).

CLASSIFICATION OF THE PROJECT WITH RESPECT TO ITS FOCUS AND POVERTY:

The program is intended to improve access to health services and shops by users in predominantly low-income groups and to lower the cost of commuting to work. It should also improve conditions for non-motorized transport (i.e. pedestrians and bicycles). Accordingly, the program is in the spirit of paragraph 2.13 of document AB-1704, which without mentioning urban transport by name refers to the need for urban development to promote a wide range of activities to further social equity and reduce poverty. In accordance with paragraph 2.15 of document AB-1704 of the Eighth Replenishment and document CP-770-1, the program is also considered to target individuals in low-income groups, well over one half of the total beneficiaries (paragraphs 5.15, 5.16, 5.18, and 5.20). Hence, the operation is a social program since it addresses the areas of priority identified in the Eighth Replenishment document and is considered to help reduce poverty.

In cases such as these, the Bank is permitted to raise the proportion eligible for financing to 60%. The table of estimated costs shows that in the present operation the percentage will be only 51.8%.

I. FRAME OF REFERENCE

A. Background: urban master plan

1.1 Curitiba is the capital of the southern Brazilian state of Paraná. Approximately 1.4 million people live in the city and nearly 2 million in the metropolitan area.

1.2 Curitiba is remarkable for the fact that it has come up with an urban master plan to address its transport needs. It is also an example of a city in which there has been genuine urban planning and public transport has been well organized. The city first embarked in this direction in 1970 under the Instituto de Pesquisas e Planejamento Urbano de Curitiba (IPPUC) when a monocentric urban street model was replaced with a plan based on linear expansion. Until that time, all the main roads converged in the city center, causing severe congestion. With the new model, some of the downtown streets were closed to traffic in an effort to reclaim the city's historic downtown area, and two central corridors running in a north-south and east-west direction were built for cars, buses, and trucks.

1.3 Each corridor is divided into three avenues, or parallel streets, that accommodate traffic flowing through the downtown area by category. The central avenue has three lanes, with the middle one reserved exclusively for buses. The outside lanes are used by local automobile traffic and delivery trucks. The other two avenues are used as expressways for rapid transit in a single direction.

1.4 Housing and shopping areas have grown along these corridors, and this has led to the construction of multistory buildings and the designation of commercial districts. As a result, demand for public transport along these corridors has risen over the last 25 years. Demand is fairly steady throughout the day because of the many different activities represented.

1.5 The steady demand for public transport in the area throughout the day and night has meant that the flow of passengers is sufficient to justify a high number of buses on the road at any one time at affordable fares.

1.6 The city's public transport system continued to expand in this manner until the Integrated Transport Network (RIT) was introduced in 1980. Transfer terminals were placed at different points in the network and the system operated on the basis of an integrated fare structure that permitted travel to all points in the RIT, including feeder routes running into the central corridors, on a single fare.

B. Organization of public transport in Curitiba

1. Urbanização de Curitiba, S.A.

1.7 The city's urban transport system is administered by the Urbanização de Curitiba (URBS), a semipublic company that is 99.9%-owned by the Municipality of Curitiba (PMC). The URBS works closely with IPPUC to ensure that transport and urban planning are compatible. The URBS's operating expenses can be covered with 4% of the fare revenue from public transport.

2. Private companies

1.8 Public bus service is operated by 10 different private companies under concessions granted by the PMC in accordance with rules, regulations, and service orders issued by the URBS. These companies are paid according to distance travelled by buses in operation. The rate per kilometer depends on the type of bus. The company agrees on a rate with the URBS on the basis of a cost analysis that includes a 12% annual return on investment. The number and type of units and the daily schedules are determined and controlled by the URBS.

C. General conditions of transport

1.9 At the present time, buses account for 70% of all motorized traffic in the city, private automobiles and taxis for 26%, and other modes of transport (mainly private buses and vans and trucks) for the remaining 4%. The proportion of travel by bus is very high by Brazilian standards because service is efficient and affordable. A passenger can travel to any point within the system on the single fare in effect (equivalent to US$0.50). Since parking is not permitted in the downtown area, and buses using the central corridors enjoy the right of way to permit the rapid movement of passengers, many drivers use public transport to commute to and from work.

1.10 Approximately 15% to 20% of all travel is on foot and 2% by bicycle. These percentages do not include the movements of pedestrians who travel part of the way by bus or by car. The bus system moves as many as 1.5 million people every day.

D. Current transport conditions along the North-South corridor

1.11 In Curitiba, rapid population growth has translated into steadily rising demand for transport, a problem that was resolved through successive increases in both bus capacity and the number of buses. Conventional buses with a nominal 60 to 80 passenger capacity were replaced first by a larger standard model with a 110-passenger capacity, and later with an articulated model with room for 170 passengers.

1.12 A total of 137 units travel along the North-South corridor, the larger of the two routes, at a rate of 90 vehicles/hour/direction, carrying about 14,000 passengers in the primary direction during peak times. This massive flow leads to a drop in average speed, the formation of convoys, and a general deterioration in service.

1.13 Demand for transport has been contained to some extent since space for new construction in the downtown area is being used up, certain districts have been designated as protected areas, and the rural exodus to the city has slowed. It is estimated, however, that demand will increase by 3% a year to the year 2000, by 2.2% a year from 2001 to 2005, and by 1.8% between 2006 and 2010. This increase will overload the present system, causing severe traffic congestion and extreme overcrowding on public transport. Hence, something must be done to increase the capacity of buses on the North-South corridor.

1.14 Some years ago, the IPPUC developed a project to replace bus service on the North-South corridor with an electric tram. A system of this kind could easily cope with 18,000 passengers/ hour/direction, operating every two minutes in convoys of two units each with a 300-passenger capacity. The capacity of the system could be expanded, through substantial changes at intersections, to 27,000 passengers/hour/direction, and this would have been enough to meet the city's transport needs over a 30-year horizon. The cost of the system was estimated at US$280 million.

1.15 Nevertheless, it was decided to try a system of semi-articulated buses with a carrying capacity of 270 passengers. This alternative would cost substantially less than a tram system and would entail only slight modification to existing infrastructure. The prototype units were built at the local plant of an international vehicle manufacturer to the specifications of the PMC, and are now in their second year of service. The test results were highly satisfactory and it has been demonstrated that a system of this kind can easily cope with 18,000 people/hour/direction, at intervals of one minute. By increasing the frequency and installing automatic controls at intersections, it could transport approximately the same volume as a tram system. This alternative was selected by the PMC because it costs 17% less than a tram system, and the savings could be used to expand bus service to areas not adequately served at this time.

1.16 The efficiency of bus service has improved significantly with the introduction of a technological innovation developed by the PMC to reduce travel time and to make getting on and off the bus more efficient. The innovation involved the replacement of stairwells with raised platforms extending from the vehicle to the tube station. This permits level boarding and leaving through wider doors through which several persons can pass at once, including people in wheel chairs. The single fare is paid at the entrance to the tube station, so the bus driver is not responsible for fare collection. These stations serve as transfer points between one

route and another. Similar boarding platforms will also be installed at the integrated terminals.

E. Problems with public transport in surrounding areas

1.17 People who have moved from the countryside over in the last 25 years have settled mainly on the outskirts of the PMC. Many of these areas have no paved roads, street lighting, or sidewalks, and do not have easy access to bus routes and other services. As a result, residents must travel downtown or great distances in order to transact business with government offices, obtain public services, do their banking and shopping, and use recreation areas.

1.18 The residents of these outlying areas, mainly in low-income groups, are at personal risk when they use these streets in such poor condition without lighting or sidewalks to reach any of the integrated terminals. The only alternative is pay an additional fare for local transport that is not in the integrated system.

1.19 It is becoming increasingly evident that the only way to resolve this situation is to expand the RIT feeder road network and to build new terminals in the suburbs. Making public and private services now located predominantly in the city's downtown area accessible to resident of these areas would eliminate much of their need to travel.

F. Air pollution and fuel consumption by urban transport

1.20 The growth in demand projected over the next few years will be accompanied by increased fuel consumption by transport and the resulting air pollution. These factors will be exacerbated as the quality of service deteriorates owing to insufficient bus capacity on the North-South corridor. An inadequate system for monitoring the quality of the air and sources of pollution in Curitiba means that no reliable data are now available. Yet, fuel consumption and pollution are of concern to all large cities in Latin America since transport accounts not only for a significant portion of fuel consumption in the region, but also for most atmospheric emissions.

G. Road safety

1.21 Population growth and the resulting increase in traffic has caused traffic fatalities involving pedestrians to mount. Statistics show that this is the leading cause of death in certain age groups. Each day an average of 37 people are involved in road accidents, of which 1.6 die and 9.2 must be hospitalized. Traffic fatalities account for 60% of all deaths and a number of critical points have been identified in the city center and around bus stations and bus stops.

1.22 The high incidence of traffic accidents could be brought down by a campaign to educate drivers and pedestrians on road and traffic

safety, and a plan to install protective works and traffic lights and signs at points of highest risk.

H. The experience of the Bank and other financial institutions in Paraná

1.23 The Bank has not financed any other operations for the PMC. Three road projects, however, have been carried out successfully by the state of Paraná with IDB financing, in the past 15 years. These projects involved: (i) a project for paving of 1,410 km of highways, completed in September 1981; (ii) paving of 1,141 km of roads, completed in November 1984; and (iii) paving of 1,103 km, rehabilitation of 1,010 km, and sealing of 1,120 km, completed in November 1989. The road maintenance loan approved in 1992 is proceeding according to plan. Considering the PMC's experience with projects not financed by the Bank and the efficiency with which municipal departments prepared the program, the members of the project team are of the view that its capacity is on a par with the Departamento de Estradas de Rodagem do Estado de Paraná, which carried out works for the state.

1.24 The PMC is now carrying out a basic sanitation and environmental clean up project valued at US$54.5 million, under a World Bank loan to the state of Paraná. The project commenced in 1994 and work is on schedule.

1.25 Both the PMC of Curitiba and the federal government have accorded this program the highest priority. This was confirmed in the April 10, 1994, meeting of the External Financing Committee (COFIEX) and in subsequent understandings between the Bank and SEAIN on March 31, 1995, at the time of the analysis mission.

I. Strategy and rationale for the Bank's involvement

1.26 The program meets the Bank's selection criteria insofar as: (i) it addresses the needs of low-income groups (through improved public transport and works in low-income areas of the PMC); (ii) the urban environment will be upgraded through measures of benefit to users of public and nonmotorized transport; (iii) the private sector will participate in the project under concessions to operate the municipal bus system; and (iv) public institutions will be strengthened through support for an efficient system of transport planning and urban development, that could eventually serve as a model for use in other cities.

II. THE PROJECT

A. Objectives

2.1 The program is designed to improve the quality of life in the city of Curitiba. Specifically, it will improve public transport, particularly for users in low-income areas on the outskirts of the city, without increasing current operating costs and fares in real terms.

B. Goals

2.2 The goals described below will be accomplished as the different components of the program come on stream (see Annex II-1, Flowsheet).

a. Average boarding time on the North-South corridor will be halved by December 1995 (at present 3 seconds/passenger with a fare collector and turnstyle and 1.6 seconds/passenger with a token-activated turnstyle), and time taken for this leg of the journey, now 55 minutes, will be cut by 8%. Without the program, any increase in demand would lengthen travel time considerably.

b. Until the year 2005, the standing passenger ratio will not exceed $7/m^2$ for more than 20 minutes during the peak and will never be higher than $8/m^2$ at any time. In other Brazilian cities and in many metrorail systems (including those in the developed countries), the ratio is as high as 10 to $12/m^2$ during the peak. Two alternatives are available without the program, either the ratio could rise to a similar level or more buses could be used, causing further congestion.

c. By September 1998, the proportion of the population transported exclusively on paved roads and city streets with services (sidewalks, drainage, and street lighting) will rise to 89% from the present level of 41%.

d. By December 1995, on the North-South corridor, accidents involving buses will have been reduced by 20% and traffic fatalities by 30% from the first half of 1995 according to traffic police data. Starting in 1997, the number of accidents per million km of bus travel and pedestrian accidents per million users of the system will stabilize or drop.

e. Towards the end of 1996, many bus riders will stop using the North-South corridor altogether or will be using it for shorter distances as a result of the service being offered by the CAURs, which will be described later on. This indicator cannot

be quantified since there is no previous experience to draw on for comparison.

2.3 In addition, the project is not expected to entail increases in real bus operating costs as determined when the fare was set. Accordingly, no fare increases will be attributable to the program.

C. Description of the program

2.4 The following expenses will be incurred to prepare and administer the program:

1. Engineering and administration

a. Executive management of the UTAG (US$300,000)

2.5 This item covers wages and salaries of staff to be assigned on a full time basis by the PMC to the Technical Management Support Unit (UTAG).

b. Advisory assistance for UTAG (US$2.2 million)

2.6 Consultants and technical experts will be hired for the UTAG staff throughout the execution period. The amount shown also includes temporary contracts for consultants hired, as needed, to deal with specific matters.

c. Studies and projects (US$880,000)

2.7 This amount covers contracts to carry out studies and designs for 50 km of feeder road, to draw up the final designs of other road improvements that will be described later, and to complete the designs of some of the structures proposed.

2. Specific components

2.8 The operation is divided into five component parts with the following subcomponents:

a. Increase in capacity on the North-South corridor (US$48.65 million)

2.9 This component includes: (i) upgrading of the asphalt surface on the center lane reserved for the new semi-articulated buses to ensure more efficient operation; (ii) remodeling and expansion of existing terminals and construction of new tube stations to accommodate the new vehicles and the rapid passenger boarding system described in paragraph 1.12; and (iii) procurement of 66 semi-articulated buses and two articulated buses, 19 buses with level boarding for operation on expressways ("ligeirinhos"), and 44 standard-type buses ("padrões") with capacity for 110 passengers to serve other routes in the public transport system integrated

network. The works will be put out to tender and supervised by the Municipal Department of Public Works (SMOP) and buses will be purchased and operated by private companies.

b. Upgrading of feeder roads (US$91.3 million)

(i) Road paving (US$87.5 million)

2.10 About 100 km of feeder roads on the outskirts of the city that are being used or will be used by the bus lines in the RIT will be paved. The works will be put out to tender and carried out under the supervision of the SMOP. The component also includes storm sewers, replacement of the subgrade, paving, construction of pedestrian walkways, street lighting, relocation of public service networks affected, and traffic signs and landscaping.

(ii) Other road improvements (US$3.8 million)

2.11 Other road improvements will be done to speed up traffic and promote greater safety along routes used for public transport. These include: (i) upgrading and rearranging flow of traffic into three sections linking up with interstate highways; and (ii) construction of two overpasses across railway tracks. These works would also be put out to tender and carried out under the supervision of the SMOP.

c. Facilities for users of public transport (US$26.75 million)

(i) User support centers (US$22 million)

2.12 Six user support centers (CAURs) will be constructed on land owned by the PMC adjacent to the integrated terminals that now handle greater passenger transit. These centers will be fully equipped with offices and shops offering a wide range of services previously available only downtown. These will include social assistance, municipal registration and certificates, notarial services, banking, and telephone service. In addition, pharmacies, a post office, restaurants, community meeting halls, and recreational facilities will be offered. "Almacenes de la Familia" outlets will open in these centers to make a basic shopping basket of goods available at cost in the suburbs without the need to go downtown. Placing services such as these at strategic points will cut down on the number of bus rides to the downtown area and will establish development and recreational areas for residents of neighboring districts. The blight of environmental degradation so often found around urban bus terminals in other cities will be avoided. Bids will be accepted on areas set aside for the private businesses and the rents will be used to defray the cost of maintaining and operating these centers. The PMC, through the URBS (with advisory assistance from the IPPUC) will carry out periodic evaluations of how areas reserved for the public sector are used and the private sector will be allowed to bid on any spaces that are found to be

inefficiently used. The CAURs have been designed by the IPPUC, the works will be put out to tender and supervised by the SMOP, with advisory support on architectural designs from the IPPUC.

(ii) Integrated terminals (US$3.1 million)

2.13 The six integrated terminals will be upgraded to accommodate the semi-articulated buses and four new terminals will be built so that feeder lines can be integrated with express routes used by semi-articulated buses and conventional buses with rapid passenger boarding systems that make fewer stops). The works will be put out to tender and carried out under the supervision of the SMOP. The works include the construction of new boarding platforms, new covered areas, and ticket sale and control facilities, and restrooms.

(iii) Bicycle paths (US$1.65 million)

2.14 The construction and/or improvement of bicycle paths and pedestrian walkways are planned to provide easier access and greater safety for pedestrians and cyclists on their way to the terminals, and to and from the work place and recreation areas. Approximately 50 km of bicycle paths and footpaths will be put out to tender and the work will be done under the supervision of the SMOP.

d. Street signs and road safety (US$10.64 million)

(i) Road safety program (US$300,000)

2.15 This component will be carried out by the IPPUC. It consists of: (a) a survey of safety conditions along the North-South corridor; (b) training for professional staff from the PMC in traffic plans to reduce accidents; and (c) a municipal traffic safety program.

(ii) Works and facilities for road safety (US$2.6 million)

2.16 This comprises mainly minor works and modifications of roads and traffic plans around the terminals and tube stations identified as areas of danger to pedestrians in particular. The IPPUC will carry out the projects, and the SMOP will handle the bidding. Both the IPPUC and the SMOP will be responsible for supervision.

(iii) Traffic lights and control systems (US$4.86 million)

2.17 A coordinated system of traffic lights will be set up along the North-South corridor. Street lights at other points in the system will be upgraded. This should reduce traffic accidents by 20% and permit traffic to flow at a faster pace. Street lights will be programmed to give priority to buses at major intersections. The URBS will issue calls for bids on the equipment and services.

(iv) Other vehicles (US$80,000)

2.18 Two vehicles will be purchased to supervise and implement road safety activities developed by the SMOP, IPPUC, and URBS.

e. Data base systems and control of fleet of public transport vehicles (US$9 million)

2.19 A transport information and a urban road safety system will be put in place to record all incidents that occur so that full information on routes and public transport can be organized, handled, and retrieved quickly and efficiently. Municipal agencies involved will be provided with information on demographic patterns, socioeconomic levels, and environmental conditions to permit integrated urban planning on the basis of a complete set of data. These activities include: (i) updating and supplementing cartographical data on the city and creating a basic digitalized map; (ii) boosting existing capacity and linking up the agencies involved by means of a computer network; (iii) modernizing the data base systems used by these agencies; (iv) collecting traffic data by geographical reference; (v) establishing a computerized transport planning and road safety data base using a geographical information system; (vi) providing training and technical assistance to various bodies to permit more effective use of data and the geographic information system; and (vii) procuring of computer equipment for buses and central offices and computerized information systems for operating units (tube stations, terminals, and garages). This component which will be developed by IPPUC, SMOP, and the URBS will eventually be incorporated into the system.

D. Cost of the program and financing

2.20 The total cost of the program will be US$231.6 million, to be financed as follows: (i) up to US$120 million from the Bank's ordinary capital to finance part of the public transport infrastructure improvement works, construction of terminals, user facilities such as the road safety program and the public transport operational control system; (ii) up to US$65.6 million from the PMC's own resources to supplement the Bank's financing and pay interest and financial charges incurred during the program; and (iii) private sector investment of US$46 million to augment the bus fleet and purchase bus monitoring equipment.

2.21 The Bank will be financing 51.8% of the total cost of the program.

2.22 The table of estimated costs on the following page shows the components of the program by source of financing:

(in US$)					
	DESCRIPTION	TOTAL	BANK	PMC	OTHER
1.	**ENGINEER. & ADMINIST.**	**3,380,000**		**3,380,000**	
1.1	Execut. manage. UTAG	300,000		300,000	
1.2	Advisory service	2,200,000		2,200,000	
1.3	Studies and projects	880,000		880,000	
2.	**INVESTMENTS**	**186,340,000**	**108,060,000**	**32,280,000**	**46,000,000**
2.1	Incr. cap. N-S corr.	48,650,000	1,200,000	6,450,000	41,000,000
2.1.1	Repav. Nor-South corr.	3,000,000	1,200,000	1,800,000	
2.1.2	Tube stations	4,650,000		4,650,000	
2.1.3	Procurement 131 buses	41,000,000			41,000,000
2.2	**Improve. feeder roads**	91,300,000	80,440,000	10,860,000	
2.2.1	Road paving	87,500,000	77,100,000	10,400,000	
2.2.2	Other road improvements	3,800,000	3,340,000	460,000	
2.3	**Fac. pub. trans. users**	26,750,000	15,680,000	11,070,000	
2.3.1	Construction of CAURs	22,000,000	14,230,000	7,770,000	
2.3.2	Integrated terminals	3,100,000		3,100,000	
2.3.3	Bicycle paths	1,650,000	1,450,000	200,000	
2.4	Markings & road safety	10,640,000	7,240,000	3,400,000	
2.4.1	Road safety program	300,000	300,000		
2.4.2	Safety works & facil.	3,000,000	2,640,000	360,000	
2.4.3	lights cont. systems	4,860,000	4,300,000	560,000	
2.4.6	Other vehicles	80,000		80,000	
2.5	Plan.- cont. pub.tran.	9,000,000	3,500,000	500,000	5,000,000
2.5.1	Data base systems	2,500,000	2,000,000	500,000	
2.5.2	Fleet control equip.	6,500,000	1,500,000		5,000,000
3.	**CONTINGENT EXPENSES**	**27,040,000**	**10,740,000**	**16,300,000**	
3.1	Contingencies	13,040,000	10,740,000	2,300,000	
3.2	Cost escalation	14,000,000		14,000,000	
4.	**FINANCIAL COSTS**	17,240,000	1,200,000	16,040,000	
4.1	Interest	15,100,000		15,100,000	
4.2	Credit fee	940,000		940,000	
4.3	Insp. and super.	1,200,000	1,200,000		
	TOTAL	231,600,000	120,000,000	65,600,000	46,000,000
	Percentage	100.0	51.8	28.0	19.9

III. EXECUTION OF THE PROGRAM

A. The borrower and the executing agency

3.1 The PMC will be the borrower and the executing agency for the program.

3.2 The components of the program will be carried out by a number of different agencies and departments of the municipal government. A UTAG, reporting directly to the mayor, will be established to coordinate the program. The mayor will appoint a general coordinator and an operations manager for this unit. The other members will be a representative from each of the different bodies participating in the program [URBS, IPPUC, SMOP, the Municipal Department of the Environment (SMMA), and the Municipal Department of Finance (SMF)]. Working closely with the Bank, the UTAG will coordinate and supervise the project. All activities developed by participating agencies will be submitted to the Bank for approval (as required). That formation of the UTAG and the appointments of the general coordinator and the operating manager were formally recognized by the PMC and approved by the Bank. 1/

3.3 In addition to the aforesaid officials from the PMC, the UTAG will have a basic complement of support staff. These individuals will be a paving engineer, a civil engineer, an environmental specialist, an accountant, an accounting assistant, a systems analyst, a data base expert, and three assistants. The support staff will be employed by either the PMC or the consultants hired for the program. The support staff for the UTAG and the latter's operations manager will be required to work full time for the program. The condition concerning the formation of the UTAG and the appointment of the general coordinator and UTAG's operations manager will have to be recorded in the loan contract as a condition that has been satisfied. It is also recommended that the loan contract include a condition for disbursement, which stipulates that contracts have been signed with URBS and the IPPUC, decentralized municipal agencies, establishing a commitment by the borrower to transfer funds to these agencies for execution and setting out their obligations under the program and the maintenance requirements for the works. 2/

3.4 As part of its duties, the IPPUC will be responsible for planning and preparing the detailed engineering designs for all of the structures and road improvements to be done under the program. The URBS will handle procurement and erection of the new tube stations. It will also plan the upgrading of intermediate and integrated

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1/ See special conditions.
2/ See special conditions.

terminals and prepare the specifications for buses to be purchased by private companies taking part in the program. In addition, it will draw up terms of reference for coordinating and supervising their involvement in the program. The SMOP will be responsible for issuing calls for tenders and for supervision of the works. The SMMA will monitor the program to ensure that its recommendations on environmental protection and conservation are being adhered to. The SMF will be responsible for budgetary and financial programming of the different program components, on the basis of the works and disbursement schedule and will administer the Bank's financial resources.

3.5 An assessment of the capacity of municipal agencies taking part in the program and the private companies operating the bus concessions shows that the work schedule for the program is satisfactory. 3/

B. Status of program preparation

3.6 Preparation of the component to augment capacity on the North-South corridor is well advanced. The plans for resurfacing approximately 19 km of routes to be used by the new semi-articulated buses have been concluded and meet standards set by the city. The plans and specifications for the tube stations are now ready; they are fairly similar in design to other stations of this type in use for the last two years. The private companies have been approved for financing to purchase all of the buses required for the program. That the semi-articulated buses are efficient and technically reliable has been demonstrated by the satisfactory performance of the prototype models used on the corridor. Given the immediate need for expanded service on this corridor, the PMC has gone ahead with calls for tenders on 14 km of resurfacing works and on construction of the tube stations on this corridor, with financing of its own. The project team has reviewed the bidding process and found it to comply with the Bank's procedures.

3.7 The plans for improvements and paving on approximately 50 km of feeder roads put out to contract with specialized consulting firms have now been concluded. They are fully satisfactory from a technical standpoint and include core budgets for the bidding. Contracts will be awarded for the remaining 50 km by the end of June 1995, and another contract will be awarded for the final designs of the road improvement works (intersections and overpasses), for which preliminary designs have been prepared by the IPPUC. This consulting work shall be completed by October 31, 1995, and its results shall be submitted to the Bank for approval by the same date.

3.8 The user facilities component is also well advanced. The architectural drawings, structural plans, and designs of the CAUR

3/ See chapter V.

facilities have been developed by IPPUC with assistance from consultants, and the bidding documents are now ready, including the core budgets. The designs and cost estimates for upgrading of existing terminals and construction of new ones have been completed and they conform to the standards established by the PMC. An inventory of the access points and bicycle paths to be included in the program is being done by the IPPUC and will be submitted to the Bank in June.

3.9 The estimated amount of the safety program has been determined. The consultants, who will prepare the terms of reference for the studies on the road safety program, must be hired by September 30, 1995, and the results must be submitted by October 31, 1995. The consultants will identify minor works and facilities that should be added to heighten road safety. The road sign and traffic light component being done by the IPPUC is nearing completion and will be submitted to the Bank by the end of June.

3.10 The Bank has seen and approved the terms of reference for the consultants who will carry out the plan for modernization of data base systems to assist with transportation planning and road safety. The Bank has also approved the specifications for the bus fleet monitoring equipment. It is estimated that these consultancies will cost US$100,000.

3.11 Given the rate of advance of program preparation and the need for its immediate implementation, the project team has approved the General Notice of Procurement and authorized its publication in Development Business.

3.12 The environmental studies for the entire program have been completed and have been available to the public since March. A construction permit for the program was issued by the Paraná Environmental Authority (IAP) in December 1994.

3.13 All of the program works will be located on public lands and property either owned by the PMC or transferred to the latter by other entities for its use over a period of more than 30 years. Accordingly, there will be no need for expropriation or compensation of any kind.

3.14 As all of the improvements planned are for roads in the city's public transport infrastructure, rights of way will not have to be extended and private property will not be affected. The possible relocation of public services that interfere with the works have been taken into consideration in the cost estimates and will be coordinated with the public agencies and private companies concerned.

C. Executions procedures

1. Contracts for consulting services

3.15 The borrower, through its different branches, has demonstrated that it has the capacity to plan and develop the operational and working designs of the various components of the program. The detailed engineering, however, will have to be done by specialized consultants.

3.16 The monitoring and technical supervision will be performed by the IPPUC for the design and architectural drawings of the projects and by the SMOP for quality control of the works. The infrastructure now in place can perform these functions. If these functions need to be expanded, however, additional staff could be hired. Consequently, consultants will not have to be used for these tasks.

3.17 As previously noted, the UTAG will be responsible for coordinating the program and for its administrative and technical control. The unit will need the support of professionals and experts, who may be from the PMC itself, or some of its branches, or else consultants hired specifically for this purpose.

3.18 In any event, the consultants will be hired with IDB resources, in accordance with Bank standards and procedures.

2. Calls for tenders

3.19 Neither the road works nor the structures planned are particularly complex or large. Consequently, prequalification of bidders is not considered necessary.

3.20 Goods will be procured and construction works will be carried out in accordance with the procedures set out in Annex B to the loan contract. International competitive bidding will be mandatory for all procurement in excess of US$350,000 and for all construction work in excess of US$5 million. These ceilings are justified since for similar projects in the country foreign bids are not accepted on contracts below these amounts. Contracts below these ceilings will conform to the requirements of Brazilian legislation, whereby competitive bidding is required only on contracts valued at the equivalent of US$1.37 million in the case of construction contracts. Closed bidding and calls for quotations are used for contracts in lower amounts. In the case of procurement, contracts in amounts of less than the equivalent of US$350,000 may be awarded by closed bidding or calls for quotations.

3.21 The bidding on works financed fully by the PMC will be conducted in accordance with the laws of Brazil. These procedures should conform to the principles of economy, efficiency, and the technical requirements of the project, and ensure that the cost of the goods is reasonable, in the Bank's judgement.

3.22 The procurement procedures for rolling stock being used by private firms providing public transport under concessions conform to Bank standards on procurement by the private sector. The goods must be of acceptable technical quality and their cost, to be recognized as part of the counterpart funding for the project, must reflect market prices. These same procedures will be used for the procurement of ancillary fleet monitoring equipment.

3. Schedule of the bidding

3.23 Annex III-1 contains a tentative procurement schedule showing the approximate dates on which notices will be published for calls for bids on items to be financed fully or partly with IDB financing.

4. Execution period and targets

3.24 The program will be carried out in three years. Using this as a benchmark, the disbursement schedule has been drawn up for the program as shown in Annex III-2. The final disbursement will be made in the second quarter of 1998.

3.25 It is estimated that the component to boost capacity on the North-South corridor will be completed in year one of the program and that the new semi-articulated units will go into service immediately.

3.26 The feeder lines will be expanded gradually as the paving works are completed. The expansion plan is expected to be completed by the end of 1997.

3.27 All of the CAURs are scheduled to be in service in late 1996.

5. Recognition of counterpart expenses

3.28 The project team reviewed the contract documents to be used in the process of hiring consultants to carry out studies and assist the PMC in preparing the program. These services were paid for with local funding in accordance with Brazilian law and the amounts involved are considered reasonable. As a result, up to the equivalent of US$500,000 could be recognized as counterpart expenses.

3.29 The bidding documents for some of the works financed fully with local funding were reviewed as well. These works are listed in Annex III-3 and in each case the bidding was found to be freely competitive and to conform to Brazilian law and PMC standards. The bidding documents set out all of the necessary designs, technical specifications, and quantities to allow bidders to submit bids within a reasonable range. No complaints or challenges were filed against the bidding process, and the winning firms are technically sound and financially solvent. The project team is of the view that payments up to an aggregate of US$13 million equivalent made on these contracts could be recognized as counterpart expenses

under the program, provided they are incurred between March 17, 1994, and the date on which the loan contract is approved.

3.30 It has been demonstrated that the private companies operating the public transport concessions have begun to purchase buses for the North-South corridor and the feeder roads. The financing provided by Banco Nacional de Desarrollo Económico y Social (BNDES) has been approved and the units are now being manufactured, at a cost of US$41 million, which will also be recognized as counterpart expenses upon presentation of paid invoices and confirmation that the units are in operation. The URBS guarantees that these vehicles will be used on the routes specified. Furthermore no changes are possible since there are no boarding platforms on other routes.

6. Contracts awarded prior to approval of the loan contract and retroactive financing

3.31 The project team has indicated that the process of bidding on the works listed in Annex III-3 should begin. If any of these contracts should commence before the loan is approved, payments to contractors corresponding to the Bank's contribution would be recognized and financed retroactively. It is estimated that this could amount to as much as the equivalent of US$8 million.

7. Capacity of contractors and local suppliers

3.32 Similar works have been carried out successfully for the PMC by local contractors. The SMOP's register of contractors is updated on an ongoing basis and does not exclude participation by foreign firms. It also classifies contractors by experience and operating capacity.

3.33 A number of local workshops have the experience and capacity to manufacture the metal components for the tube station structures, the roofing of the CAURs, and some of the associated equipment.

3.34 The Brazilian automotive industry produces different types of urban buses, including articulated buses that have been in use for many years in different cities in the country. These vehicles have also been sold abroad. Brazil has four chassis manufacturers (three of which produce for Curitiba bus companies and for articulated buses) and about six manufacturers of vehicle bodies. The chassis for the semi-articulated bus has been developed and is being manufactured by the VOLVO plant in Curitiba, using the latest technology to ensure optimum performance on the city's road system. At least two other firms could produce chassis of this kind if justified by demand.

D. Operation and maintenance

3.35 Public transportation on the North-South corridor and the feeder roads will continue to be provided by private companies under the present concession agreements. Authorization for bringing new units into service and for expanding and/or modifying routes and schedules will be done by means of service orders issued by the URBS. Buses will be maintained by the companies that own the vehicles in accordance with the standards of safety and efficiency set by the URBS. The cost of maintenance will be considered as part of the cost of wear and tear paid to these companies by the URBS. Companies that fail to follow itineraries and schedules as agreed are fined by the URBS and are not paid for the trip. This policy has resulted in a 99.6% rate of compliance with schedules, a far better record than most railroad systems. The inability of companies to pass efficiencies on to passengers through higher fares has compelled them to operate with the highest efficiency in all aspects of vehicle maintenance, fuel consumption, and driver and office staff performance.

3.36 The SMOP will continue to be responsible for maintenance of roadways. The department's annual operating budget should allow for road maintenance work of the quality required for efficient operation of the new semi-articulated buses. Urban roads and bus routes are well organized and properly maintained.

3.37 The CAURs will be maintained and supervised by private firms under contract. The services will be paid out of rental revenue received by the PMC for shops and businesses located in the CAURs.

3.38 So that the works and facilities are properly maintained, the PMC shall: (i) carry out periodic inspections of the condition of roads, buildings, and facilities; and (ii) submit in the first quarter of each year a report on maintenance for the preceding year and the planned maintenance for the present fiscal year, with the corresponding budget. 4/

3.39 The annual report on maintenance shall describe maintenance works performed the previous year, maintenance contracts granted and evidence that they have been performed satisfactorily, and the maintenance plan for the year under way, and financing set aside for maintenance.

E. Audit

3.40 The financial statements of the executing agency and the project shall be audited by the Auditor General of the State of Paraná, in

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4/ See special conditions.

accordance with the accounting standards and criteria established by the Bank. 5/

F. Ex post evaluation

3.41 The borrower has expressed interest in an ex post evaluation of the program. The URBS has the resources and means to gather statistical information and the IPPUC is conducting spot public opinion surveys as part of its regular activities, and additional staff or specialized firms will not have to be hired for this purpose. The terms of reference and instructions for the evaluation will be submitted to the Bank within one year of the date of signature of the loan contract and the results of the evaluation will be presented to the Bank within 18 months of the date of the final disbursement. 6/

G. Special study

3.42 Curitiba's previous experience with urban transport has been covered fully in the specialized press and the present project has stimulated interest in the city's transportation system of experts and authorities in other parts of Brazil and Latin America, and even Europe and North America. The URBS receives frequent visits of this kind, which are sometimes followed up by invitations to the president of the URBS to visit other cities in Latin America to provide advisory support in setting up similar transportation systems.

3.43 Nothing concrete has emerged from these contacts; visits usually last only days and this is hardly enough time for establishing mechanisms to ensure continuity and efficiency. The URBS would like to have the capacity to transfer management experience it has acquired to other transport bodies, helping them to prepare terms of reference for consultants that would be hired to design and implement similar projects adapted to local needs. To achieve this, the URBS' specialized assistance would be needed from time to time at critical project times.

3.44 Terms of reference have been approved for a study to determine how the URBS can modify its structure to address similar requests in the future and to be compensated for any expenses incurred. The study will be carried out either by the URBS or an individual consultant, at an estimated cost of US$30,000.

H. Environmental considerations

3.45 From an environmental standpoint, the program will target either areas of high urban density or residential and commercial zones.

5/ See special conditions.
6/ See special conditions.

The new works (of limited impact on space) will affect either the existing right of way or occupy developed urban property. Some of the community service centers will in fact be located in industrial facilities that have been converted to popular markets or local recreational and commercial areas. Expropriation will not be required for paving and improvements of access routes to the terminals and these works will not affect urban land use in the project area. The construction of the tube stations and road improvements works will not disrupt traffic during the construction phase although it will have some localized environmental impact of a temporary nature. The route through the downtown area to be used by the semi-articulated buses was mapped out so that architectural restoration would not be necessary and the existing North-South corridor could be used. The route selected will make it possible to restrict certain streets in the old part of the city to pedestrians, thereby enhancing the urban appearance, raising their commercial value.

3.46 The public transport components of the program (i.e. improvement of the North-South corridor for use by semi-articulated buses, paving of access routes, and construction of tube stations) and its urban development components (i.e. CAURs or decentralized community service centers) will alleviate traffic congestion significantly in the downtown area, and reduce air pollution and, to a lesser extent, noise pollution.

3.47 The program will also make it possible to cut down on the number of buses circulating through the city center, while increasing passenger capacity. Bottlenecks will be eased considerably by the fact that fewer buses are in service, and public services and shops at the CAURs on the city limits will mean that many users will no longer have to travel downtown to transact business or go shopping.

3.48 The environmental impact assessments were conducted by Universidade Livre do Meio Ambiente (UniLivre) in conjunction with the IPPUC. These studies have been available for consultation by the public since March and the notice has appeared in the Official Gazette of the Nation. During the planning and design, the residents of the city were informed of the projects and their input was requested at public meetings and debates through the media. A construction permit (Nº 354/94 of December 22, 1995) for the program was issued by the IAP.

3.49 The environmental impact assessment will identify adverse effects on traffic that need to be alleviated during the construction period. It will also be necessary to increase pedestrian safety and to set up a system to monitor levels of air and noise pollution, at an estimated cost of US$5.4 million (factored into the cost of the program). The environmental activities will involve measures to speed up the flow of traffic and the placement of street signs and traffic lights. It will also involve the recovery and expansion of the network of environmental monitoring stations,

information campaigns for users of the roads affected, an accident prevention program advertized through the media, the integration of the environmental monitoring stations into a geographical reference system for environmental planning and control for the entire metropolitan area of Curitiba.

3.50 The new vehicles will be fuel efficient, cutting down on air pollution, in contrast to a scenario without the project. The semi-articulated buses have a dead weight of just 72 kg per passenger with a normal operating load (270 passengers), or approximately the same weight as a moped (motorized bicycle), and half the fixed weight/passenger ratio of an urban monorail system. At full capacity of 270 passengers, the semi-articulated vehicle obtains 362 passenger-km per liter of fuel, and 181 passenger-km per liter at half capacity. These figures are 2.45 times the efficiency of the standard-type bus (padrão) in comparable circumstances (and the standard model is much more efficient than most other buses used in Latin America). Besides being fuel efficient, the vehicles will have the latest design in terms of being pollution-free.

IV. THE BORROWER AND THE EXECUTING AGENCY

A. The borrower and the executing agency

1. Introduction

4.1 The PMC will be the borrower and the executing agency for the program.

2. Organization of the Curitiba public transport system

a. General considerations

4.2 Curitiba has a well developed public transport system. The administration of the system and the installed capacity of its infrastructure have steadily kept pace with demand. The city's sector policies accord priority to the improvement and conservation of existing infrastructure and its ability to meet future demand. The system's organizational, operational, and administrative structure has been decentralized to make it easier for the public and private sectors to work together, and to achieve a degree of efficiency not seen elsewhere in Brazil or the rest of Latin America. The bodies described in the following sections make up this structure.

b. Instituto de Pesquisas y Planejamento de Curitiba

4.3 The Instituto de Pesquisas y Planejamento de Curitiba (IPPUC) is an independent branch of the PMC that was established by municipal Act 2660 of December 15, 1965. It is basically responsible for integrated urban planning. This involves adapting sector plans (mainly in the transport sector, with the exception of public transport planning which is done jointly with the URBS) to the city's urban development plans and preparing studies and research that enable the IPPUC and other municipal bodies to meet these objectives. It is organized into a board of directors, the office of the president and its advisory units, five supervisory departments (data processing, communications, planning, implementation, and administration and finance). The IPPUC has a staff of 435 employees, of which 182 are professionals, most of whom are highly qualified, a factor that contributes to the success of its work.

c. Urbanização de Curitiba, S.A.

4.4 The URBS is a semipublic company established, in accordance with Municipal Law 6155 of June 26, 1980, by the PMC. The company is owned partly by private investors to ensure responsible management of mass transit in the city. The company also administers the fund described in paragraph 4.5, public spaces (at stations, bus

terminals, CAURs, etc.) which are rented out to private individuals, parking meters, and the urban taxi system. Working jointly with the Military Traffic Policy of the State of Paraná (BPTRAN) it also helps to enforce the city's traffic laws.

4.5 The URBS serves in an administrative capacity to collect and use the resources of the Curitiba Urbanization Fund (FUC) to finance the urban infrastructure and equipment programs and public transportation service in the city (see Annex IV-1). In return the URBS receives from the fund 4% of all fare revenue. The FUC is funded from fares charged by the URBS for public transport in the city, the interest on short-term investments, and special contributions by the PMC. Over 90% of Fund resources go to pay concessionaires in the private sector for transport services provided, 4% is paid to the URBS to administer the fund, and the balance is used for infrastructure improvements and works associated with operating a transport service. The URBS is able to defray the cost of administering the city's transport system with the proceeds of the 4% payment from FUC resources and revenue from user permits and concessions. The program will benefit in particular from the fact that the URBS will be allocating commercial areas in the CAURs (i.e. food service, magazines, groceries, etc.) through bidding in addition to receiving a monthly rent that will be used to cover the cost of CAUR operation and maintenance. Annex IV-2 sets out an analysis of the URBS's financial situation.

4.6 The URBS has a board of directors, a president who is assisted by two operating units, a department of operations, and a department of finance and administration. The URBS also has a staff of 1,038 employees, including administrators of transport and concessions at terminals, conductors, maintenance workers and cleaning staff at stations and terminals, and parking attendants.

d. Municipal Department of Public Works

4.7 The SMOP is an agency of the PMC created by Municipal Law 7671 of June 10, 1991 and subsequently amended by Law 8240 of August 26, 1993, and Law 8260 of September 30, 1993. One of its objectives is to plan and operate, directly or through third parties, all transportation works in the city of Curitiba. It is also responsible for maintaining these works and municipal roads and equipment. The SMOP's highest authority is the secretary. It also has a supervisory department. Both the secretary and the supervisory department are assisted by advisory units. In addition, it has five operating departments: construction, sewer and water services, transportation infrastructure, paving, and road maintenance. The road maintenance department is divided into seven units covering all districts in the city. This department also accounts for 706 of the SMOP's 1,058 employees. That 67% of its entire complement of staff is concentrated in maintenance works reflects the importance of this branch.

e. Municipal Department of Finance

4.8 The SMF, another municipal agency, was established by Municipal Law 7671 of June 10, 1991, for the purpose of planning and implementing the PMC's economic, fiscal, and financial policy in accordance with the IPPUC's development plans. It is also responsible for taxpayer relations and for providing financial advisory assistance to other municipal bodies. Except for transport sector resources administered by the URBS, the SMF is in charge of all other municipal revenue and payments associated with transportation. It is organized into a secretariat department with advisory units and three supervisory units (tax control and studies, financial control and coordination, and budget and costs). The SMF has a complement of 318 employees, of whom 105 are professional staff. The PMC is audited by the Comptroller for the state of Paraná.

f. Municipal Department of the Environment

4.9 The Municipal Department of the Environment (SMMA) is an agency of the PMC established by Municipal Law 7671 of June 10, 1991, for the environmental protection and conservation of the PMC. By law, works in all sectors (private and public) are subject to approval by the SMMA. The SMMA also establishes and enforces standards for the control of environmental pollution by traffic in the city.

3. Financial condition of the PMC

a. Introduction

4.10 To evaluate the financial capacity of the PMC (borrower and executing agency) to carry out the works in question and the latter's creditworthiness, its background and projected financial results were analyzed on the basis of the consolidated budgetary information on the company and its affiliates possessed by the PMC.

b. Financial background analysis

4.11 The official budgets approved for the 1992-1994 period and the statements of budgetary performance for the same period were analyzed. In light of the high inflation reported during the period in question, budgetary performance figures were restated to reflect the actual rate of monthly progress and the average exchange rate for translation to current dollars.

4.12 Comparative figures for annual revenue as reported in the statements of budgetary performance are set out below:

TABLE IV-1 Statement of consolidated income for the PMC (in US$ millions)						
Item	1992		1993		1994	
	Perform.	%	Perform.	%	Perform.	%
I. Current income	421.6	99.5	410.6	99.3	483.5	98.2
A. Tax	75.9	17.9	67.5	16.3	111.7	22.7
B. Contributions	9.3	2.2	3.4	0.8	9.4	1.9
C. Capital	129.5	30.6	91.5	22.1	73.1	14.9
D. Services	90.5	21.4	133.5	32.3	114.7	23.3
E. Transfers	84.3	19.9	94.4	22.8	137.5	27.9
F. Other	32.1	7.6	20.4	4.9	37.0	7.5
II. Capital income	2.1	0.5	3.1	0.7	8.8	1.8
Total income	423.7	100.0	413.7	100.0	492.3	100.0

4.13 During the period under review, the PMC reported average annual revenues of approximately US$443 million, of which operating income represented 99% and disbursements from financing received 1%. Transfers to the PMC as its share of federal and state revenues accounted for 24% of the total revenue from services, particularly transportation (i.e. FUC), for 25.7%, income from leases and interest-bearing accounts for 22.3%, municipal taxes, charges, and rates for 19.4%, and mandatory municipal employees contributions and miscellaneous revenue for the balance.

4.14 Consolidated expenses for the same period are shown below:

TABLE IV-2 Statement of consolidated expenses for PMC (in US$ millions)						
Item	1992		1993		1994	
	Perform.	%	Perform.	%	Perform.	%
I. Payroll expenses	122.1	30.4	135.2	36.3	147.4	32.9
A. Staff	113.0	28.1	124.8	33.5	120.7	27.0
B. Transfers	9.1	2.3	10.5	2.8	26.7	4.9
II. Operating expenses	219.4	54.6	242.2	65.1	261.6	58.4
III. Current transfers	16.3	4.1	40.6	10.9	37.9	8.5
A. Debt service	14.4	3.6	38.5	10.3	35.3	7.9
B. Transfers	1.9	0.5	2.2	0.6	2.6	0.6
IV. Capital investment	79.8	19.8	52.9	14.2	100.1	22.4
A. Works	72.5	18.0	52.3	14.1	80.6	18.0
B. Investments	7.3	1.8	0.6	0.1	19.5	4.4
V. Commitments payable in future periods [1]	-35.7	-8.9	-98.9	-26.5	-99.5	-22.2
Total expenses	401.9	100.0	372.0	100.0	447.5	100.0

1/ Represents commitments in respect of investment expenses carried forward to more than one financial year.

4.15 Analysis shows that on average staffing expenses accounted for 33.1% of total outlays during the period in question, and other operating expenses for 59.2%. Debt service and certain minor transfers to government and private institutions amounted to 7.8% of total expenses. Investment in works and interest-bearing accounts represented on average 19.1% and commitments payable in future periods 19.2%.

4.16 A comparison for the three-year period in question shows that income and expenses were in balance. It is important to note that the impact of hyper-inflation during this same period caused certain distortions that impeded any reliable analysis of historical trends. A comparison of income and expenses in percentage terms, however, gives a clearer picture of the trend in the PMC's finances.

TABLE IV-3

Comparative annual analysis of income and expenses (as a %)

Item	1992	1993	1994
A. Operating income	100	100	100
B. Operating expenses (including wages and salaries)	81	92	85
C. Gross income (A-B)	19	8	15
D. Current transfers (debt service)	3	10	8
E. Amounts payable in future periods	8	24	21
F. Net income (C-D+E)	24	22	28
G. Lending operations	0	1	2
H. Funds available for investment	24	23	30
I. Investments made	19	13	21
J. Surplus/Deficit for period	5	10	9

4.17 Table IV-3 shows that during the period in question the PMC had sufficient resources to meet financial commitments from operations, to service its debt, and to satisfy financing requirements under its investment plan. Operating revenue were used to satisfy 99% of these payments, with the balance being funded by outside financing.

c. Financial projections

4.18 The PMC's financial projections were prepared on the basis of the statement of budgetary performance and the projected trend in certain parameters of growth from 1995 to 2000. These projections are shown below:

TABLE IV-4

Municipality of Curitiba
Consolidated income and expenses (projected)
(in US$ millions)

Item	1995	1996	1997	1998	1999	2000
I. Current income	470.0	532.3	605.1	689.1	785.9	897.1
II. Capital income	15.6	80.5	42.1	31.9	40.0	30.0
Total income	**485.6**	**612.8**	**647.2**	**721.0**	**825.9**	**927.1**
I. Payroll expenses	147.2	160.3	174.5	189.9	206.8	225.1
II. Operating expenses	296.1	335.1	379.4	429.4	486.1	550.3
III. Current transfers	8.5	10.7	13.8	19.8	28.9	29.4
IV. Investments	33.8	106.7	79.5	81.9	104.1	122.3
Total expenses	**485.6**	**612.8**	**647.2**	**721.0**	**825.9**	**927.1**

4.19 Current income is expected to continue at much the same level as in previous periods. This means that transfers from federal and state revenue-sharing will account for approximately 32% of the total. Revenue from services will account for 27% of the total, and tax revenue about 26.5%. Of the remaining 15%, 5.7% will come from outside financing including the present IDB loan and 9% from mandatory employee contributions, interest income, and other sources.

4.20 The pattern of expenses shows that payroll and operating expenses will amount on average to 85% of total outlays. Debt service which comes under current transfers will account for only 1.9% of total projected outlays. The works program, including the present project, will account for 9.6% of total expenses. Financing will be raised to fund 55% of the program.

4.21 The PMC's financial projections for the six-year period considered, expressed as an average in percentage terms, are shown below:

TABLE IV-5

	(as %)
Current income	100.0
Current expenses	
Wages and salaries	27.7
Operating expenses	62.2
Operating results	10.1
Service on the debt	2.0
Net generated	8.1
Loans	6.0
Funds available	14.1
Investments and other outlays	14.1
Surplus/Deficit	0

V. FEASIBILITY OF THE PROGRAM

A. Technical feasibility

5.1 The program is basically designed to increase the capacity and efficiency of public transport, through state-of-the-art technology (semi-articulated buses and other level boarding vehicles and tube stations) of proven performance and reliability. The complexity of the works is not beyond the scope of the local construction industry, and the PMC has a qualified professional staff that has had considerable experience in managing and monitoring works similar to the components of the present program. The road works have been scheduled to avoid insofar as is possible any disruptions to traffic and inconvenience to residents in the vicinity of the project area. In some cases, the most extensive works have been broken up to minimize the construction time required.

5.2 The Bank will help to defray the cost of preparing the technical documents for most of the projects. As the documents, which are now ready, have been reviewed by the Project Team and are considered satisfactory, calls for tenders could be issued immediately.

B. Institutional feasibility

5.3 The program will be carried out by the PMC, which has developed Brazil's most efficient public transport system. The UTAG was set up to ensure that all of the activities to be undertaken by the agencies taking part in program are properly coordinated and monitored. Moreover, the private companies operating the bus concessions in the city are exceptionally well organized and managed, a factor that has contributed in no small part to the success of the system. Given this background and in light of the measures taken by the PMC, the proposed structure more than meets the requisites for successful execution of the program.

C. Financial feasibility

5.4 The amount of the program that the PMC must finance from its own resources will be approximately US$65.6 million, or approximately 3% of projected current revenue during the period that the program is under way. The PMC's annual financial projections and its local counterpart funding requirements are shown in Table V-1.

5.5 The table shows that the PMC will have sufficient resources to cover payroll and operating costs, service its debt, finance its part of the program, and generate funding to meet all remaining investment planned. Other planned investments include numerous high-impact projects to improve social conditions in the community. Some of these projects will have to be put off until later if the financing requested for the present operation is not forthcoming.

5.6 In addition, as part of the program, public transport vehicles would be purchased by the private sector, at a cost of US$46 million. This amount, together with the US$65.6 million contribution from the PMC, makes up the local counterpart funding for the program. The private companies taking part in the program have furnished evidence showing that they have arranged to procure the vehicles required. It has also been demonstrated that these companies have raised the necessary financing from BNDES for the purchase of the vehicles (see paragraph 3.30).

TABLE V-1

Analysis of financial position and local funding requirements (in US$ millions)

Item	1995	1996	1997	1998
Current income less:	470.0	532.3	605.1	689.1
Wages and salaries	147.2	160.3	174.5	189.9
Operating expenses	296.1	335.1	379.4	429.4
Operating income	26.7	36.9	51.2	69.8
Less: services on the debt	5.5	7.0	9.3	14.4
Net funds generated:	21.2	29.9	41.9	55.4
Less: local contribution IDB program	16.4	29.4	17.4	4.8
Balance for other investment	4.8	0.5	24.5	50.6

5.7 The analysis in chapter IV indicates that the PMC has the financial capacity to carry out the project.

D. Economic feasibility

1. Economic internal rate of return

5.8 The economic internal rate of return (EIRR) and the net present value (NPV) determined according to the criteria used by the Bank have been applied to quantifiable benefits and costs and expressed in economic terms. The quantifiable benefits of the program are: (i) a reduction in the cost of capital and vehicle operating costs as a result of the improved technology along the North-South corridor and paving of other roads used by the urban public transport service (TCU), automobiles, and trucks; (ii) savings in fuel consumption and shorter travel time on the North-South corridor as a result of the new system of traffic lights, a benefit to riders and, to a lesser extent, traffic on roads running parallel to the bus lanes; (iii) a reduction in the number of buses on the North-South corridor, with the presence of the CAURs (estimated at 5% of total based on surveys taken to determine reasons for travel); (iv) less travel time on the corridor and other program roads (estimated to have a value of 30% of equivalent work time); (v) lower road maintenance costs resulting from the technically improved paved surface; and (vi) fewer accidents.

5.9 Many other benefits will accrue too although they cannot be quantified in monetary terms. These include: (i) reducing the incremental unit cost of bus operation on the North-South corridor in a scenario without the project, if demand were to increase;

(ii) reduction in pollution attributable to fewer vehicles on the North-South corridor, the use of technologically advanced pollution-free vehicles and savings in fuel consumption owing to road paving works and more direct routes; (iii) a rise in property values around the six integrated terminals with CAURs; (iv) the main part of the TCU will be made fully accessible to the handicapped and partially mobile; (v) street lighting, drainage, and sidewalks in low-income neighborhoods; (vi) cycle paths will be built for transport and recreation; and (vii) shorter travel time as a result of the CAURs.

TABLE V-2

PROFITABILITY INDICATORS

	EIRR (%)	NPV (US$ millions)
Program overall	40.9	312.0
Paving and feeder road development	56.7	269.9
Improvements on North-South corridor (*)	27.6	47.7
	SENSITIVITY ANALYSIS (+25% costs -29% benefits)	
Program overall	24.0	-
Paving and feeder road development	34.5	-
Improvement on North-South corridor (*)	15.5	-

* Does not include benefits from containing exponential increase in costs in the event of higher demand.

5.10 The economic internal rate of return on the project is high at 40.9% and its net present value is US$312 million, based on a annual real rate of interest of 12%.

5.11 Although the program is planned as an integrated series of activities, profitability indicators of its two principal cost components were determined as follows: (a) paving and development of feeder roads with an EIRR of 56.7% and a NPV of US$269.9 million; and (b) the improvements on the North-South corridor have an EIRR of 27.6% and a NPV of US$47.7 million, excluding the benefits derived from exponential cost/passenger growth in the event of increased demand under the present public transport system. As the costs of supervision of works, terminals, etc. which were factored into EIRR and NPV for the program overall were not considered in these calculations, the NPV for these two components is slightly higher than for the program as a whole.

5.12 Rapid criteria were used to measure minor components to see whether the benefits could be partly quantified in monetary terms. Traffic safety component will be paid in year one of the program. The impact of the CAURs on the costs of the North-South

corridor will pay for the cost of one within two years. The traffic light component will pay for itself within three years on the fuel savings alone.

2. Sensitivity analysis

5.13 The sensitivity analysis in Table V-2 shows that the program would continue to offer a high return even in the eventuality of a 25% increase in costs combined with a 25% drop in benefits, with an EIRR of 24.5%. In these same conditions, the return on the feeder road (34.5%) and the North-South corridor (15.5%) components would also be high.

3. Distributive impact

5.14 The program is designed to lower costs and improve public transport and traffic conditions for nonmotorized modes of transport (i.e. pedestrians and cyclists). The purpose of walking and cycling is mainly to commute to work, or to go to school, the doctor, or shopping.

5.15 The program fits in with the spirit of paragraph 2.13 of the Eighth Replenishment document. The document does not single out urban transport in particular, but it alludes to the need to promote a broad range of activities for urban development concerned with social equity and the elimination of poverty.

5.16 Paragraph 2.15 of document AB-1704 and document CP-770-1 point out that a project can be classified as focussing on poverty if more than one half of the beneficiaries are in low-income groups.

5.17 An initial estimate was made of the percentage of bus riders in low-income groups based on the 1991 census, data on bus routes, and certain assumptions as to user distribution to determine whether the program satisfies this low-income requirement. The Bank takes per capita income of US$91/month as the poverty threshold, in November 1994 figures. This figure was updated in February 1995. This value was weighted against the number of persons per household to determine the household low-income threshold.

5.18 It was found that low-income households accounted for 70% of users on the North-South corridor and 67% of users overall.

5.19 In February 1995, to ascertain whether the assumptions used were at all reasonable, a survey with questions covering all modes of transport was taken of a sample of households in two areas: Cabral, one of Curitiba's wealthiest neighborhoods, and Pinheirinho, one of its poorest. The main beneficiaries of the program were considered to be bus riders and pedestrians and cyclists.

5.20 It was found that 73% of the beneficiaries in Cabral and 96% of those in Pinheirinho are from low-income groups, an indication

that the original estimates were too conservative. This also confirms that the program is poverty-related. That 67% of bus users (see paragraph 5.18) are from low-income groups is considered a more realistic figure.

5.21 In certain cases, the Bank will allow the financing percentage to be increased to as much as 60%. The percentage for the present operation is 51.3%.

4. Distributive effects of taxes and subsidies and their impact on economic incentives

5.22 Bus fares cover all of the concessionaires expenses. This includes a rate of return of 12% on the investment, and fuel, oil, and sales taxes, property tax on vehicles, equipment, spare parts, and buildings, and services tax. Users also pay the costs of administering the system since 4% of the bus fare goes to the URBS, which receives the rents from businesses in commercial spaces in stations and adjacent buildings. As this is a nonsubsidized user-pay system in which bus operating costs are fully covered, there is considerable concern about providing service as efficiently as possible. As the payments made by the URBS are based on the average cost/km of service for an efficient company, each of the bus companies has an incentive to reduce its costs.

5.23 Property taxes will be levied on private cars, and fuel and oil will be taxed. Rates charged for public parking will be competitive with the rates charged by private parking garages, which will be one of the main incentives to reducing traffic congestion.

5.24 The fuel tax will virtually double the price of diesel fuel and triple the price of gasoline. Although the fuel tax will not be based on the cost of maintaining the municipal road system, the amount paid by each driver will be directly proportional to use of the system, and a portion of the tax collected will go to the PMC. Between 1990 and 1993, annual expenses incurred by the PMC for maintenance and urban road construction came to approximately US$25 million. Yet, in 1994, the PMC raised only US$5.6 million in fuel tax and US$15.3 million in vehicle property tax. The PMC also receives: (i) a portion of the revenue from the state transport and services tax on fuel and other factors of transport. The total amount raised in this way was US$85.2 million (although the specific transport component cannot be increased, it is substantial); and (ii) a portion of the federal tax on vehicles and other factors of transport. These figures suggest that what the PMC gets back from the transport sector is somewhat more than the expenses it incurres.

5.25 These taxes are relatively efficient, i.e. they are easy to administer as revenue collection mechanisms and their impact is progressive. Users of private automobiles pay relatively more for use of roads than bus riders. The property taxes and the gasoline tax are higher than the tax on diesel fuel and public

transport, and automobiles are much more efficient in terms of passenger/kilometer. Thus, the tax structure offsets to some extent the negative externalities of private automobiles.

5.26 The operation will reduce the adverse effects of private transport. In addition, it targets low-income groups, since most of the investment will be in infrastructure of benefit to users of public transport, pedestrians, and cyclists. The program will make it possible for public transport to keep pace with residential and commercial demand, through a fast, fuel-efficient transportation system.

5.27 The operation is economically feasible, and fits in with Curitiba's urban development model and public transport system.

E. Environmental considerations

5.28 All modes of transport and alternative routes have been studied in preparing the city's urban transport program. The environmental impact assessments have identified those areas that will be served and affected by the project and an action plan has been drawn up as a safeguard against air and noise pollution and to preserve the appearance of the urban landscape. The program will also broaden the scope of the environmental monitoring system by incorporating the date base used in urban planning. The operation is environmentally feasible since it will introduce measures to enhance safety, prevent accidents, and alleviate any adverse environmental effects.

F. Risks

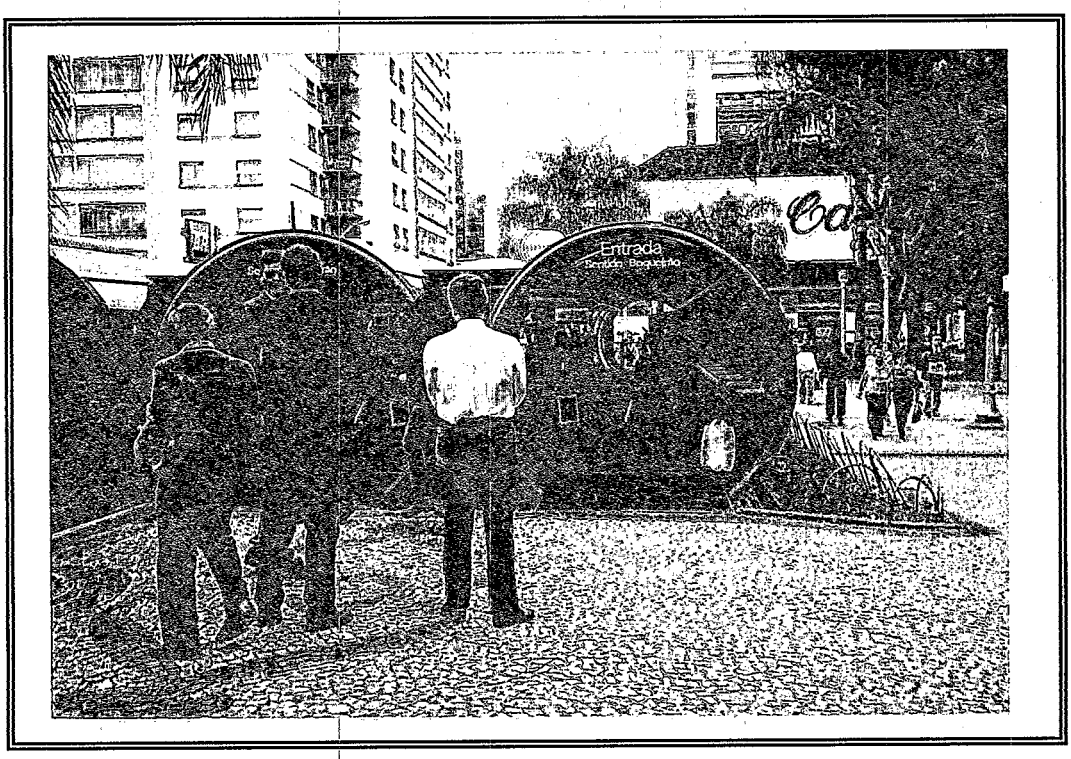
5.29 Insufficient local counterpart funding and the inability of the executing agency to prepare and carry out the components swiftly and smoothly are some of the main risks associated with urban transportation projects. Another is resistance on the part of the local population to radical changes in transportation routes and traffic patterns. In Brazil these risks are compounded by problems with certain types of bidding and the enforcement of contracts in an inflationary economy.

5.30 The likelihood of these risks arising during the present program is minimal. Much of the counterpart funding has been guaranteed through financing arrangements for the purchase of the buses. The PMC has already used a significant portion of the counterpart funding to prepare the projects and carry out preliminary works or has been earmarked in the budget for 1995 and 1996. Most of the designs have now been done. Any that are left are of a routine nature and should be ready by the time the operation goes to the Board, together with virtually all of the bidding documents. The municipal departments involved have shown that they have the capacity to carry out the works and the other activities and components. The residents of the project area have been informed of what is to be done. In the past, they have agreed to similar changes. Lastly, the current rate of inflation

will not pose problem for the bidding, which the PMC has been able to organize in a fairly short time. Except for the CAURs, which will take approximately one year, most of the works can be done in a matter of weeks or months. Consequently, any delays will not adversely affect the other improvements or seriously disrupt the transportation system.

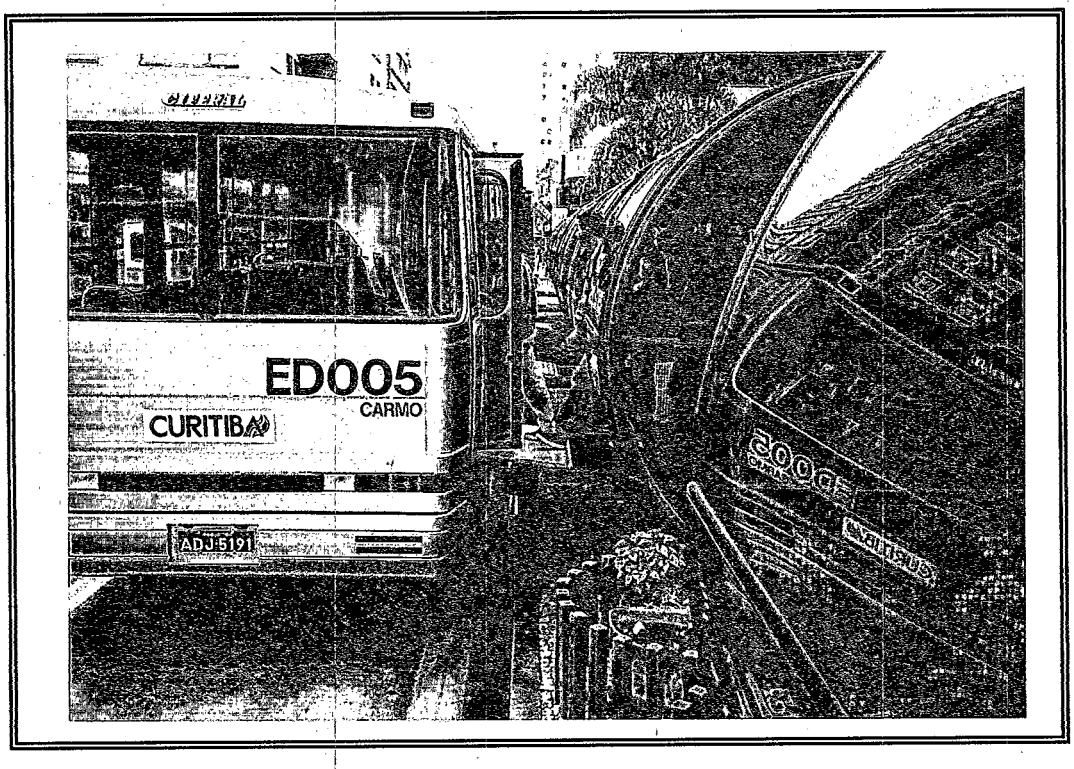
A bi-articulated bus, with capacity for 270 passengers and platform-level boarding.

Fig. 2



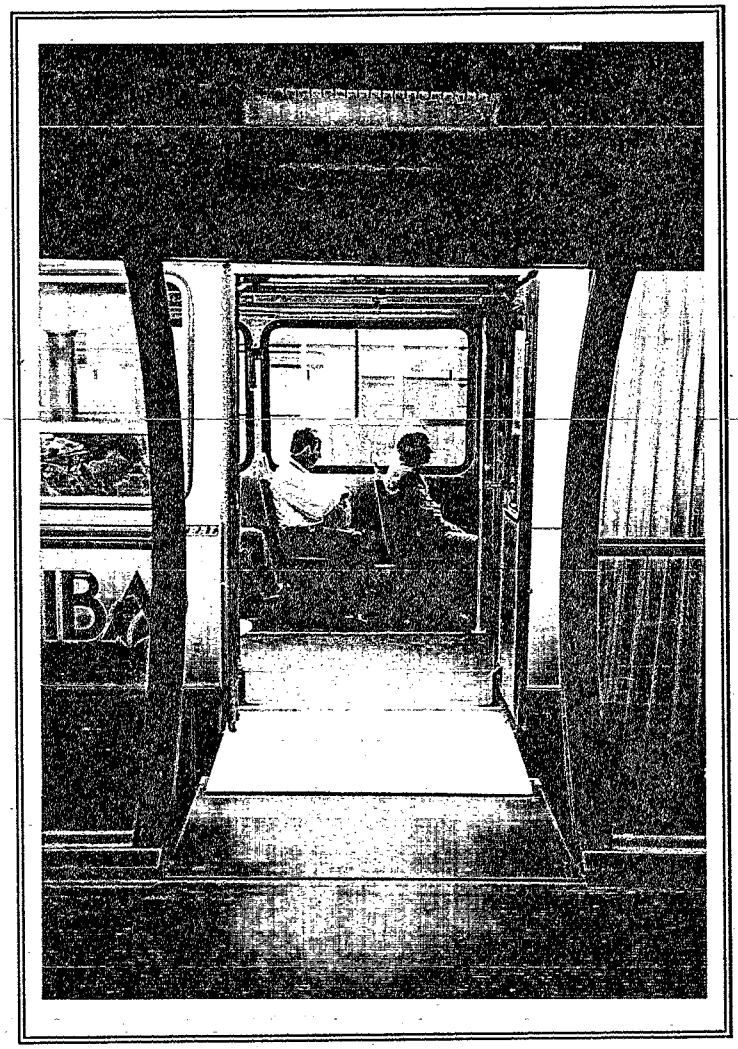
Users pay the tariff at any of the six doors to the 3-tube station, and move toward the left to board the bus (Fig. 3).

Fig. 3



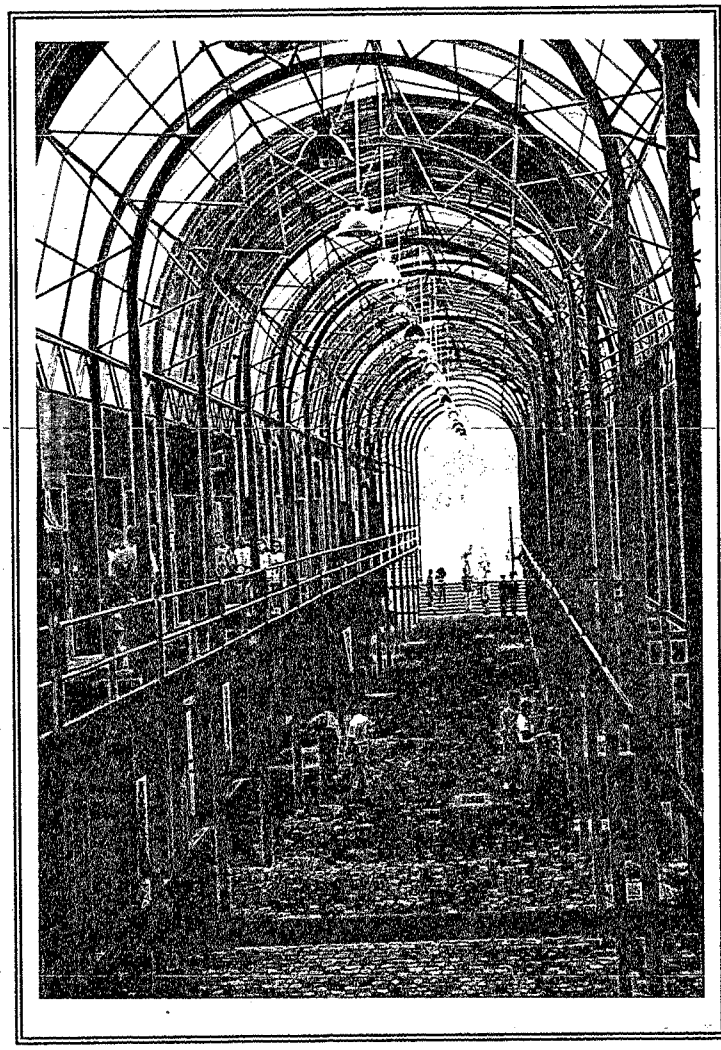
The driver stops the bi-articulated bus at a prefixed position next to the tube station and presses a button that lowers the plates on the outside of the bus doors onto those of the platform, opens the doors and initiates the platform-level boarding/alighting procedure.

Fig. 4



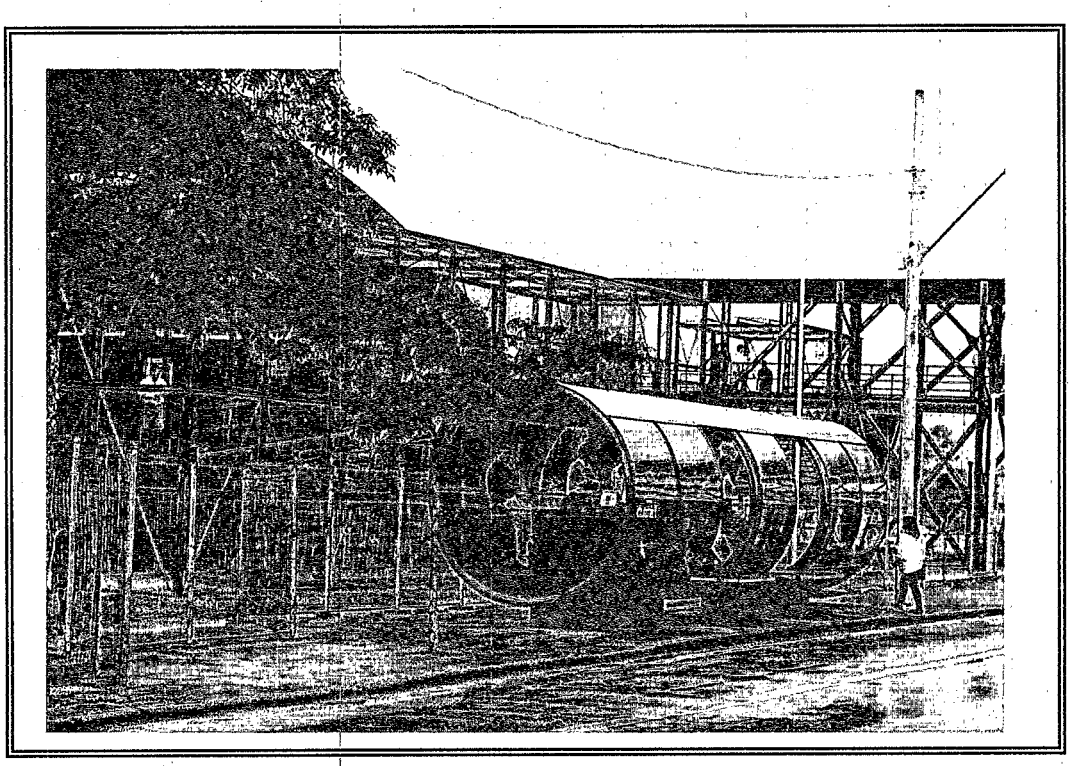
The platform-level boarding/alighting eliminates the steps on buses and provides complete wheelchair accessibility. Platform boarding has a synergetic effect, increasing the point-to-point speed of buses, the comfort, and the capacity of the system, while decreasing the cost per passenger. In other parts of the integrated bus system, platform-level boarding/alighting is used with smaller buses and ramps that are retrofitted into conventional stations.

Fig. 5



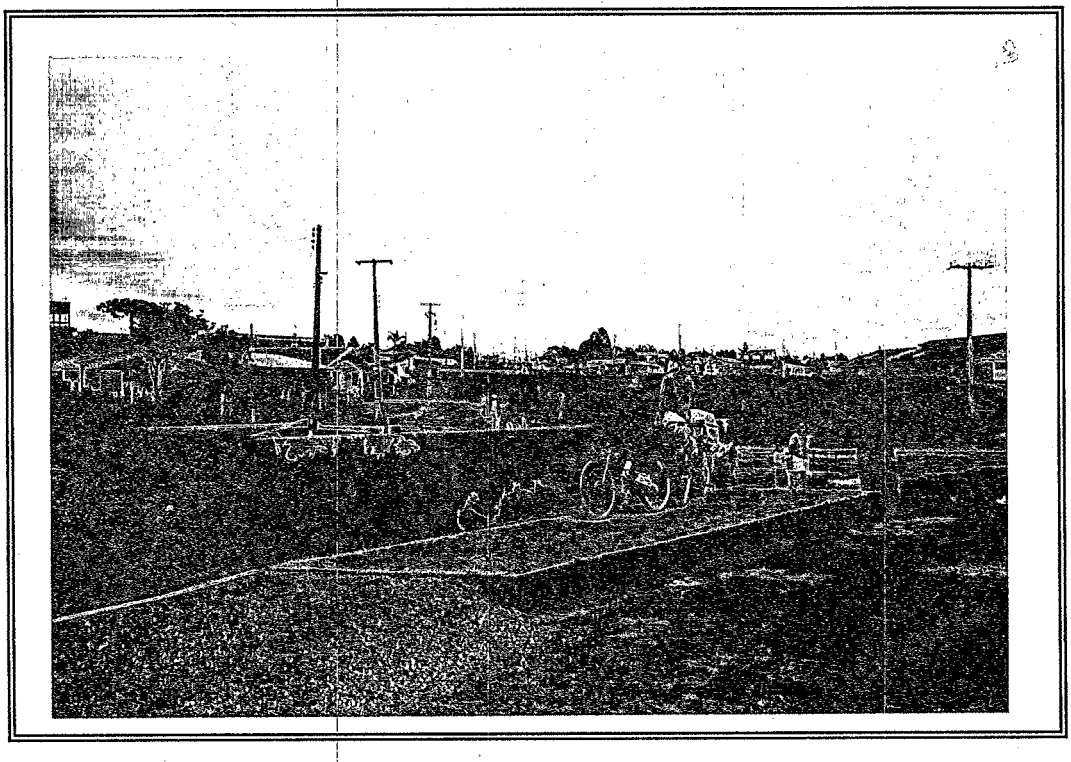
The interior of one wing of the Carmen neighborhood Center of Support for Bus Users (CAUR). Here users can, without having to go to the city center, obtain municipal services, pay bills, and purchase food, other staples, and medicines, which should lead to a reduction in demand for trips on the main bus corridors.

Fig. 6



A tube station for the express bus ("ligeirinho"), next to the Center of Support for Bus Users in the Carmen neighborhood.

Fig. 7



A low-income area where roadways will be built and paved for bus routes and where sidewalks, bikeways, and public lighting will be implanted.